

REMARKS/ARGUMENTS

I. Summary of the Office Action

Claims 1-10 and 12-37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,667,993 (Lippett).

II. Summary of this Reply

Claims 1, 3, 5-10, 12-21, 23-37 are now pending in this application. Claims 1, 12, 13, 20, 21 and 31 are the only independent claims.

Claims 1, 7, 12, 13, 20, 21 and 31 have been amended to define still more clearly what Applicants regard as their invention, in terms which distinguish over the art of record. Claims 2, 4, 11 and 22 have been cancelled.

III. The Lippett Prior Art Reference

Lippett discloses a digital system having two or more nodes and a communication channel for transferring a single stream of ordered data from one node to another. "The communication channel (110) has a number of data links (110a-110g) for transferring a plurality of sub-streams of data in a parallel fashion in order to transfer more data than a single data link is capable of transferring" (Lippett; Abstract).

As depicted in Fig. 2 of Lippett, circuitry 150a-g divides a single stream of ordered word data on bus 150 into a plurality of sub-streams of ordered byte data that is then transmitted over data links 110a-110g. As each of these data links has an inherent, potentially different, transfer delay time; a skew is induced between the various received data sub-streams at receivers 132a-132g. Lippett's invention relates to designating one of the links as a master link and then synchronizing the remaining "slave links" to this master (col. 4, lines 3-16).

The Present Invention

The present invention provides a method and apparatus for ensuring synchronization for digital communication between a transmitting device and a receiving device, particularly when the clock and/or frame synchronization is sourced from a different location than the transmit data. In particular, the present invention relates to a point-to-point communication established between two devices. The present invention addresses the problem in the prior art when the original transmitting device has control of the time reference and subsequently the original receiving device sends a signal back to the original transmitting device. As described in the Background section of the specification (e.g., page 6, line 24 through page 7, line 14), the unknown delay associated with this transmission causes problems in properly receiving the signal. The present invention determines this delay in an initialization process and then uses this delay for subsequent communications between the devices.

IV. Response to 103 Rejections

Turning first to the rejection of claim 1, Applicants have amended claim 1 to include the limitation of former claim 2 and have cancelled claim 2. Thus as currently written, claim 1 recites a method of digital communication between two devices. The method comprises, a first device transmitting a predetermined bit pattern to a second device responsive to a start signal generated at said second device. The method further comprises a sampling step wherein the second device samples for bits of said predetermined bit pattern at sampling times determined as a function of a delay period after said start signal. This sampling step is performed twice before proceeding further. If the second device does not detect said predetermined bit pattern, the delay period is increased and the above steps are repeated, as necessary. If the second device detects said predetermined bit pattern, the last delay period used in the above sampling step is set as the delay period to be used by said second device for sampling data for further transmissions from said first device to said second device. The method further comprises the second device using this last delay period for sampling further data transmissions from said first device to said second device.

An important feature of claim 1 is the determination of a “round trip” delay period which corresponds to the time period from when the second device transmits a start signal and subsequently receives the predetermined bit pattern from the first device in response. Timing problems in the prior art associated with this round trip delay are discussed in the Background section of the specification (inter alia, at page 6, line 24 through page 8, line 2). The present invention addresses these problems in the prior art.

As noted above, Lippett relates to dividing a signal and transmitting it over a plurality of sub-channels. The signals received at the corresponding plurality of receivers are then synchronized with each other. This synchronization is a necessary initial step in combining the data received over the sub-channels (e.g., ref. Figs. 16B and 16C and accompanying text of Lippett at col. 20, lines 49-67). Moreover, this synchronization process is performed in a manner different from the synchronization of claim 1.

As an initial matter, Applicants will define the correspondence between Lippett’s communication nodes, on the one hand, and the “first device” and “second device” of claim 1, on the other hand. Assuming, *arguendo*, that the multiple receiver arrangement of Lippett is a single device, this device cannot be the “first device” of claim 1 as it does not transmit a predetermined bit pattern. Rather, transmitter 121 outputs the “stuff pattern” in the payload (as referenced by the Examiner in col. 4, lines 60-67 of Lippett). Accordingly, Lippett’s item 120 (containing item 121) corresponds to the first device of claim 1 and item 130 (the multiple receiver arrangement) corresponds to the second device.

As currently written, claim 1 comprises a first device transmitting a predetermined bit pattern to a second device in response to a start signal being generated at the second device and then sampling the bit pattern by the second device at sampling times determined as a function of the delay period from the start signal. The use of a delay period relative to the start signal generated by the second device is not taught in Lippett. Fig. 16A, item 1610 and col. 9, lines 20-40, cited in the Office Action as determining the delay period, do not do so relative to a start signal from the second device. Rather, they simply utilize frame pulse information transmitted with the data from the first device (Lippett’s item 120).

As Lippett is concerned with synchronizing sub-channels (within the second

device), he neither teaches nor suggests determining a delay associated with a "round trip" transmittal of a start signal from the second device and the subsequent arrival of a test pattern in response. Accordingly, Lippett neither teaches nor suggests the feature of claim 1 wherein the delays are determined relative to a start signal sent from the second device. For at least these reasons, claim 1 is patentable over Lippett.

Independent claims 12, 13, 20, 21 and 31 have been amended to include the above patentable feature of claim 1 as well. Accordingly, they are patentable over Lippett for at least all of the same reasons.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

CONCLUSION

In view of the foregoing amendments and remarks, Applicant believes claims 1, 3, 5-10, 12-21, 23-37 to be patentable and the application to be in condition for allowance, and respectfully requests issuance of a Notice of Allowance. If any issues remain, the undersigned requests a telephone interview prior to the issuance of an action.

Respectfully Submitted,

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